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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER

ENG, MARSHALL S

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 01/14/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/931,996

Applicant(s)

HOSHIZAWA ET AL.

Examiner

Marshall S Eng

Art Unit

2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) Z.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1.1 Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

A claim to priority should also be made in the first line of the specifications identifying the specific prior foreign application (the oath and application data sheet disclose two prior foreign applications) that priority is being claimed upon.

Drawings

2.1 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 301, 302, 310 of Figure 1 and Figure 3.

2.2 The drawings are objected to because reference 102 of Figure 11 appears to be incorrect. From the specifications, lines 10-13 of page 18, it appears that it should be labeled as 101.

2.3 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 1202 of Figure 12.

2.4 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 1803 of Figure 18B.

2.5 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 1701 and 1904 of Figure 19.

2.6 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 1511 of Figure 15.

2.7 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 1601 and 1602 of Figure 16 and references 1601, 1602, and 1701 of Figure 17.

2.8 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 1701, 1904, 2003 of Figure 20 and Figure 26.

2.9 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 2003 of Figure 23a, 23b, and 24.

2.10 The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: reference 1701 and 1904 of Figure 25.

2.11 Figures 3-10 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. These figures are fully described under the

“Background of the Invention” section and therefore seen as prior art. See MPEP § 608.02(g).

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3.1 A substitute specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b) is required. The specification appears to be a literal translation into English from a foreign document and is replete with grammatical and idiomatic errors. The substitute specification filed must be accompanied by a statement that it contains no new matter.

Some specific examples of the unclear specifications are on lines 17-20 of page 11 where “the row talks noting” is interpreted to describe the relation of the data that has been written to the data that is physically on the medium and on lines 9-20 of page 25 where an “M-series generating circuit” is described.

3.2 The disclosure is further objected to because of the following informalities: the description of an M series generating circuit on lines 9-20 of page 25 is unclear.

3.3 The disclosure is further objected to because of the following informalities: there is missing closing parentheses on lines 14-16 of page 25 to close the parentheses that begins with “a circuit generating....”

Appropriate corrections are required.

Claim Objections

4.1 Claim 5 and 11 are objected to because of the following informalities: the phrase "M-series" is not clearly or distinctly described in the specifications (page 25).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5.1 The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5.2 Claim 5 and 11 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5.3 Claim 5 and 11 recites the limitation "M-series" in line 4 of both. There is insufficient antecedent basis for this limitation in the claim. As stated above in the objections to the specifications, M-series and M-series generating circuits are not described in a manner that would allow one skilled in the art to determine the exact meaning/definition/use of them.

Therefore, for the purposes of examining, an M-series generating circuit is being interpreted as a pseudo random number generating circuit and an M-series is interpreted as a pseudo random number.

Claim Rejections - 35 USC § 103

6.1 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6.2 This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6.3 Claim(s) 1-7 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art 'Specifications' (hereinafter Specs) in view of Sollish et al. U.S. Patent No. 6,311,305 (hereinafter Sollish).

As per claim 1,

Specs substantially teaches of a method of recording data on a medium that comprises of rearranging an order of words (interleaving) forming a data train constituting an error correcting code for recording the data on the recording medium, see lines 3-20 of page 4. Specs further teaches of recording the data on the medium in the order that they have been rearranged (interleaved), see lines 9-25 of page 4.

Specs does not teach of rearranging (interleaving) each of the data trains under a different rule. Nonetheless, Specs does teach of interleaving/rearranging the entire ECC block with a single rearrangement rule, see lines 6-10 of page 8.

Sollish, in an analogous art, teaches of using different interleaving rules for different data groups/data trains, see lines 35-60 of column 4 and specifically Figure 6 for the mapping/interleaving scheme based on the group number (i.e. data train ID number). While Sollish does not explicitly teach of interleaving each row separately, Sollish does teach of interleaving each data group according to different rules (based on the group number said data belongs to). With the applicant's ID field of each data unit (as seen in Figure 4), it is clear to one of ordinary skill in the art that the data group number is similar to the ID field.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Specs to include the interleaving scheme of Sollish so as to be able spread out the physical locations of the sequential data over the media so as to not let errors grossly impact any on segment of data, see Sollish lines 55-60 of column 4. This modification would have been obvious because one of ordinary skill in the art would have been motivated by the suggestion provided by Sollish that interleaving is chosen to sufficiently insure that reasonable levels of digital storage medium imperfection damage will cause contamination of only a few constituent symbols of an ECC codeword, see lines 60-65 of column 4.

As per claim 2,

Specs further teaches of using a cross Reed Solomon code as the error correcting code, see lines 23-24 of page 2.

As per claim 3,

Specs further teaches of rearranging the order of the words except for the identification information, see lines 6-15 of page 3.

As per claim 4,

Sollish further teaches of using a plurality of rules to rearrange the words, see Figure 6 where each rule is dependent upon the number of the data group that the data is in.

As per claim 5,

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the words according to an M-series (pseudo random number series). The limitation of the claim, as they are interpreted, simply selects a pseudo random number and places the current bit/byte/word of data into that position. As is known in the art, the idea behind interleaving is to basically separate contiguous pieces of data so that burst errors can be overcome. Also known in the art is that interleavers and their corresponding de-interleavers both know of the reordering/rearrangement of the data in order to recreate the data in the correct order. Therefore it would have been obvious to one of ordinary skill in the art that some type of random number sequence (i.e. the order in which the pieces/bits/bytes/words of data is written) would have been used in an interleaver to rearrange the words.

As per claim 6,

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an arithmetic progression. From Specs, see page 31 lines 16-23, it is clear that the use of an arithmetic progression merely interleaves data

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by placing every n th piece of data, i.e. with $n=3$ every 3rd piece of data would be placed 0, 3, 6, 9, ... 177, 180, 1, 4, 7, ..., 178, 181, 2, 5, 8, ..., 176, 179. On a smaller scale with only 11 pieces of data, 0-10, using $n=3$ again yields: 0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8. What is clearly visible to one of ordinary skill in the art is that the arithmetic progression defines the distance or pieces of data between any two contiguous pieces of data. For example, in the smaller scale with 11 numbers, it is clear that 0 and 1 are four spaces away as are 1 and 2. Therefore it is clear that the arithmetic progression is equivalent to an interleave scheme that separates contiguous data by a specified amount of time/spaces. This is well known in the art as setting an interleave ratio or factor, where a ratio or factor such as 4:1 is used to denote that every piece of contiguous data is 4 away.

As per claim 7,

Further it would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange data words that has been combined with a plurality of data words as a group. One skilled in the art would know that many time sensitive applications, such as network communication and data access time, rely heavily on the speed at which data that has been received/read can be de-interleaved and made useful. It would have been obvious to one skilled in the art to, with the desire to speed up both interleaving and de-interleaving process, to group plural words together. By grouping plural bytes/bits/words together, one reduces the amount of interleaving/de-interleaving that is required. One of ordinary skill in the art would obviously want to save time while maintaining the benefits of interleaving whenever the cases of the time

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sensitive applications of above arise. Therefore it would have been obvious to reduce the time take to interleave/de-interleave by grouping pieces/bits/bytes/words of data together.

6.4 Claim(s) 8-13, 15 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art 'Specifications' (hereinafter Specs) in view of Sollish et al. U.S. Patent No. 6,311,305 (hereinafter Sollish).

As per claim 8,

Specs substantially teaches of a method of recording data on a medium that comprises of adding error correction data, rearranging an order of words (interleaving) forming a data train constituting an error correcting code for recording the data on the recording medium, modulating the data train, and recording the data train, see lines 3-20 of page 4 and 25-29 of page 4.

Specs does not teach of rearranging (interleaving) each of the data trains under a different rule. Nonetheless, Specs does teach of interleaving/rearranging the entire ECC block with a single rearrangement rule, see lines 6-10 of page 8.

Sollish, in an analogous art, teaches of using different interleaving rules for different data groups/data trains, see lines 35-60 of column 4 and specifically Figure 6 for the mapping/interleaving scheme based on the group number (i.e. data train ID number). While Sollish does not explicitly teach of interleaving each row separately, Sollish does teach of interleaving each data group according to different rules (based on the group number said data belongs to). With the applicant's ID field of each data unit

(as seen in Figure 4), it is clear to one of ordinary skill in the art that the data group number is similar to the ID field.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Specs to include the interleaving scheme of Sollish so as to be able spread out the physical locations of the sequential data over the media so as to not let errors grossly impact any on segment of data, see Sollish lines 55-60 of column 4. This modification would have been obvious because one of ordinary skill in the art would have been motivated by the suggestion provided by Sollish that interleaving is chosen to sufficiently insure that reasonable levels of digital storage medium imperfection damage will cause contamination of only a few constituent symbols of an ECC codeword, see lines 60-65 of column 4.

As per claim 9,

Specs further teaches of rearranging the order of the words except for the identification information, see lines 6-15 of page 3.

As per claim 10,

Sollish further teaches of using a plurality of rules to rearrange the words, see Figure 6 where each rule is dependent upon the number of the data group that the data is in.

As per claim 11,

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the words according to an M-series (pseudo random number series). The limitation of the claim, as they are interpreted, simply

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selects a pseudo random number and places the current bit/byte/word of data into that position. As is known in the art, the idea behind interleaving is to basically separate contiguous pieces of data so that burst errors can be overcome. Also known in the art is that interleavers and their corresponding de-interleavers both know of the reordering/rearrangement of the data in order to recreate the data in the correct order. Therefore it would have been obvious to one of ordinary skill in the art that some type of random number sequence (i.e. the order in which the pieces/bits/bytes/words of data is written) would have been used in an interleaver to rearrange the words.

As per claim 12

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an arithmetic progression. From Specs, see page 31 lines 16-23, it is clear that the use of an arithmetic progression merely interleaves data by placing every nth piece of data, i.e. with $n=3$ every 3rd piece of data would be placed 0, 3, 6, 9, ... 177, 180, 1, 4, 7, ..., 178, 181, 2, 5, 8, ..., 176, 179. On a smaller scale with only 11 pieces of data, 0-10, using $n=3$ again yields: 0, 3, 6, 9, 1, 4, 7, 10, 2, 5, 8. It would have been obvious to one of ordinary skill in the art is that the arithmetic progression defines the distance or pieces of data between any two contiguous pieces of data. For example, in the smaller scale with 11 numbers, it is clear that 0 and 1 are four spaces away as are 1 and 2. Therefore it is clear that the arithmetic progression is equivalent to an interleave scheme that separates contiguous data by a specified amount of time/spaces. This is well known in the art as setting an interleave ratio or

factor, where a ratio or factor such as 4:1 is used to denote that every piece of contiguous data is 4 away.

As per claim 13.

Further it would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange data words that has been combined with a plurality of data words as a group. One skilled in the art would know that many time sensitive applications, such as network communication and data access time, rely heavily on the speed at which data that has been received/read can be de-interleaved and made useful. It would have been obvious to one skilled in the art to, with the desire to speed up both interleaving and de-interleaving process, to group plural words together. By grouping plural bytes/bits/words together, one reduces the amount of interleaving/de-interleaving that is required. One of ordinary skill in the art would obviously want to save time while maintaining the benefits of interleaving whenever the cases of the time sensitive applications of above arise. Therefore it would have been obvious to reduce the time take to interleave/de-interleave by grouping pieces/bits/bytes/words of data together.

As per claim 15.

Further, once a method, as in claim 8, is known/determined, it would have been obvious to one of ordinary skill in the art to implement the method in hardware devices such as circuits and signal processors to add/perform error correction, (de)modulate data, and to (de)interleave the recorded/reproduced data.

6.5 Claim(s) 14 and 16 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art 'Specifications' (hereinafter Specs) in view of Sollish et al. U.S. Patent No. 6,311,305 (hereinafter Sollish).

As per claim 14,

Specs substantially teaches of a method of reproducing data that is modulated and recorded on a recording medium comprising demodulating a data train on the recording medium, see lines 9-15 on page 5, rearranging the order of the words (de-interleaving the interleaved data) by releasing the interleave, see lines 12-14 of page 5, and of correcting errors contained in the data train, see lines 14-15 of page 5.

Specs does not teach of rearranging (de-interleaving) the order of words under a rule determined by every data train (i.e. separate rules for every data train).

Sollish, in an analogous art, teaches of using different interleaving rules for different data groups/data trains (and hence different de-interleaving rules for each group/train), see lines 35-60 of column 4 and specifically Figure 6 for the mapping/interleaving scheme based on the group number (i.e. data train ID number). While Sollish does not explicitly teach of interleaving each row separately, Sollish does teach of interleaving each data group according to different rules (based on the group number said data belongs to). With the applicant's ID field of each data unit (as seen in Figure 4), it is clear to one of ordinary skill in the art that the data group number is similar to the ID field.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Specs to include the interleaving scheme

of Sollish so as to be able spread out the physical locations of the sequential data over the media so as to not let errors grossly impact any on segment of data, see Sollish lines 55-60 of column 4. This modification would have been obvious because one of ordinary skill in the art would have been motivated by the suggestion provided by Sollish that interleaving is chosen to sufficiently insure that reasonable levels of digital storage medium imperfection damage will cause contamination of only a few constituent symbols of an ECC codeword, see lines 60-65 of column 4.

As per claim 16.

Further, once a method, as in claim 8, is known/determined, it would have been obvious to one of ordinary skill in the art to implement the method in hardware devices such as circuits and signal processors to add/perform error correction, (de)modulate data, and to (de)interleave the recorded/reproduced data. Further, it would have been obvious to use a pickup for recording data to a data medium because a pickup is commonly used and well known in the art to be used in the recording of data.

Conclusion

7.1 The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Dent et al. U.S. Patent No. 5,230,003

This reference teaches of using different interleavers to ensure a low correlation between encoders occurs.

b. Suda et al. U.S. Patent No. 6,553,516

This reference teaches of interleaving each row with different interleavers.


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7.2 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marshall S Eng whose telephone number is (703) 305-4638. The examiner can normally be reached on M-T, 8:30 am to 5:30 pm and every other F, 9 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.


mse


for
Albert DeCady
Primary Examiner